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Title of the Device: VACUUM PARTS FEEDER

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Specification

1. Title of the Device

VACUUM PARTS FEEDER

2. Scope of Claim for Utility Model

(1) A vacuum parts feeder comprising a rotary ring that has a multitude of air communicating holes and is disposed so as to pass through a parts feeding section and a parts discharging section and an air suction device disposed at a position inside of said rotary ring, wherein said air communicating holes and said air suction device are adapted to communicate with each other in a region from said parts feeding section to a position before said parts discharging section, so that parts can be transported while being sucked onto said rotary ring.

3. Detailed Description of the Device

An object of the present device is to provide a vacuum parts feeder of simple structure that is capable of transporting a large quantity of parts reliably and continuously at equal intervals from a parts feeding section to a parts discharging section.

The present device has been developed mainly for the purpose of transporting parts (hereinafter the word "parts" is used to represent small articles such as tablets as well as mechanical parts, according to the customary usage) such as tablets and sliced dry fish paste.

The vacuum parts feeder according to the present device, in order to achieve the object described above, comprises a rotary

ring (2) that has a multitude of air communicating holes (1), (1) ··· and is disposed so as to pass through the parts feeding section (3) and the parts discharging section (4), and an air suction device (5) disposed at a position inside of the rotary ring (2), wherein the air communicating holes (1), (1) ··· and the air suction device (5) are adapted to communicate with each other in a region from the parts feeding section (3) to a position before the parts discharging section (4), so that the parts (a), (a) ··· can be transported while being sucked onto the rotary ring (2).

The device will now be described in detail below by way of embodiments shown in the accompanying drawings.

The embodiment shown is for the transportation of tablets (parts) (a), (a), ···. In the first embodiment shown in Figs. 1 through 4, a motor with reduction gear (7) and a frame (8) are fastened onto a base plate (6) and a hollow support shaft (9) is supported in horizontal arrangement in fixed state on the frame (8). The hollow support shaft (9) has a cylinder (10) attached concentrically with the hollow support shaft (9) at the distal end thereof.

The cylinder (10) has a rotary ring (2) movably fitted on the outer circumferential surface (11) thereof, and a boss (13) is supported rotatably on the outer circumferential surface of the hollow support shaft (9) via bearings (12), (12). The rotary ring (2) and the boss (13) are connected with each other via a connecting plate (14), so that the three members (2), (13), (14)

rotate together. The three members may also be formed in an integral body. These members are connected to the motor with reduction gear (7) via a chain (15) so as to be driven to rotate clockwise as shown in Fig. 1 by the motor (7).

The rotary ring (2) has a number of air holes (1), (1) ··· disposed at equal intervals along the circumferential direction. Each of the air holes (1), (1), ··· has an annular projection (16) formed at the upper edge thereof for supporting the tablet (a) in stable state as shown in Fig. 4.

Disposed under the rotary ring (2) is a parts feeding section (3) consisting of a tank that stores a number of tablets (a), (a), ···. Also disposed obliquely above the rotary ring (2) is a parts discharging section (4) consisting of a chute arranged to make contact with the rotary ring (2).

Inner space of the cylinder (10) is partitioned by a partition wall (17) into a suction chamber (19) and an air discharge chamber (20). The air discharge chamber (20) is provided only at a position inward from the parts discharge section (4), and is connected to an approach means (not shown) via a connecting tube (18). The suction chamber (19) that occupies most of the inner space of the cylinder (10) communicates with a suction passage (21) formed in the hollow space of the hollow support shaft (9). The suction passage (21) is connected to air suction means (not shown) such as suction pump via a connecting tube (22), and therefore air sucking action is always working in the suction chamber (19).

The cylinder (10) has, on the outer circumferential surface (11) thereof, elongate holes (23) that communicate with the air communicating holes (1), (1), ··· in a region from the parts feeding section (3) to the parts discharging section (4). As a result, air sucking action of the suction chamber (19) is exerted on the air communicating holes (1), (1), ··· in a region from the parts feeding section (3) to the parts discharging section (4) of the elongate holes (23), while air discharging action from the air discharging chamber (20) is exerted on the air communicating holes (1), (1), ··· in the parts discharging section.

Thus according to this embodiment, the tablets (a), (a), ··· located on the parts feeding section (3) are sucked onto the air holes (1), (1), ··· of the rotary ring (2) by the air sucking action, and are transported to the parts discharging section (4) while being sucked as the rotary ring (2) rotates, so as to be supplied to the parts discharging section (4) by the air discharging action.

While the air suction device (5) of this embodiment is constituted from the air suction means, the connecting tube (22), the suction air passage (21), the suction chamber (19) in the cylinder (10) and the portion of the elongate holes (23) extending from the parts feeding section (3) to the parts discharging section (4), various other forms may also be employed. In this embodiment, a ridge is formed at the center of width of the outer circumferential surface (11) of the cylinder (10) and a recess that fits movably

with the ridge is formed at the center of width of the inner circumferential surface of the rotary ring (2) as shown in Fig. 4, so that the rotary ring (2) is restricted by the cylinder (10) from moving laterally. Reference numeral (24) in Fig. 4 denotes sealing members that seal the gap between the rotary ring (2) and the cylinder (10), which are ring-shaped sealing members that are adhered to the right and left sides of the inner circumferential surface of the rotary ring (2).

The second embodiment of the present device shown in Fig. 5 is the first embodiment having such a function added thereto that checks the tablets (a), (a), ··· being transported by the rotary ring (2) to see if there is flaw and/or stain on both sides of the tablet (a).

In this embodiment, a holding section (25) having a tablet housing groove (26) is provided to protrude on the outer circumferential surface of the rotary ring (2) so that the tablet (a) can be sucked onto the air hole (1) of the rotary ring (2) while being in standing posture as shown in Fig. 5. The width of the tablet housing groove (26) is set somewhat larger than the thickness of the tablet (a). The air communicating hole (1) is provided at the center of the bottom of the tablet housing groove (26).

The entire rotary ring (2) including the holding section (25) is made of a transparent material such as glass or transparent plastic. This makes it possible to optically check the tablets

(a) to see if there is flaw and/or stain on both sides of the tablet by means of inspecting devices (27), (27) disposed on both sides of the holding device (25). With other respects, the constitution is the same as that of the first embodiment.

Besides the embodiments described above, the present device can be embodied in various forms. For example, while the air discharging chamber (20) is disposed on the inside of the parts discharging section (4) in the first embodiment, this constitution is not essential for the present device and such a constitution can be employed as the parts (tablets) (a) are supplied to the parts discharging section (4) by gravity without providing the air discharging chamber (20). Also such a constitution may also be employed as the air holes (1), (1), ··· are disposed in a plurality of rows in the circumferential direction of the rotary ring (2) so that a large number of parts (tablets) (a), (a), ··· can be transported. Structures and positions of disposing the parts feeding section (3) and the parts discharging section (4) are also not limited to those of the embodiments described above.

While the embodiments described above are related to the transportation of the tablet (a), it needs not to say that the present device can be embodied for the transportation of other parts (a).

The present device, with the constitution described above, can provide the vacuum parts feeder that is capable of transporting a large quantity of the parts reliably and continuously at equal

intervals from the parts feeding section to the parts discharging section by means of air sucking action.

The present device can provide the vacuum parts feeder that has a simple structure of the entire apparatus as a whole comprising components of relatively simple structures such as the rotary ring, the parts feeding section, the parts discharging section and the air suction device.

4. Brief Description of the Drawings

Fig. 1 is a front view showing the first embodiment of the present device, Fig. 2 is a side view showing a part thereof in longitudinal section, Fig. 3 is a perspective view with a part thereof cut away, Fig. 4 is a side view showing a key portion thereof being enlarged in longitudinal section, and Fig. 5 is a side view showing a key portion of the second embodiment of the present device being enlarged in longitudinal section.

(1) Air communicating hole

(2) Rotary ring

(3) Parts feeding section

(4) Parts discharging section

(5) Air suction device

Fig. 1

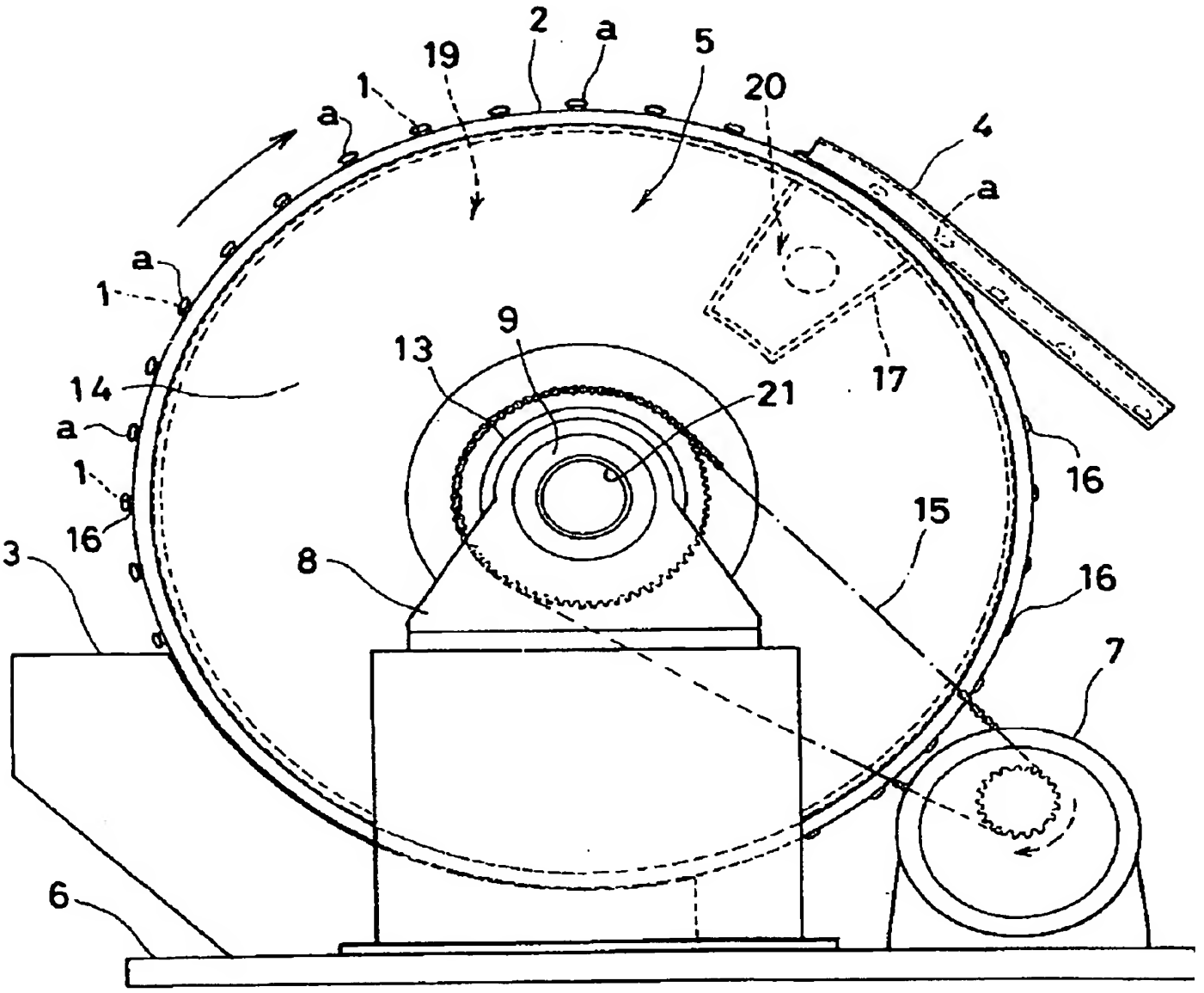

Fig. 2

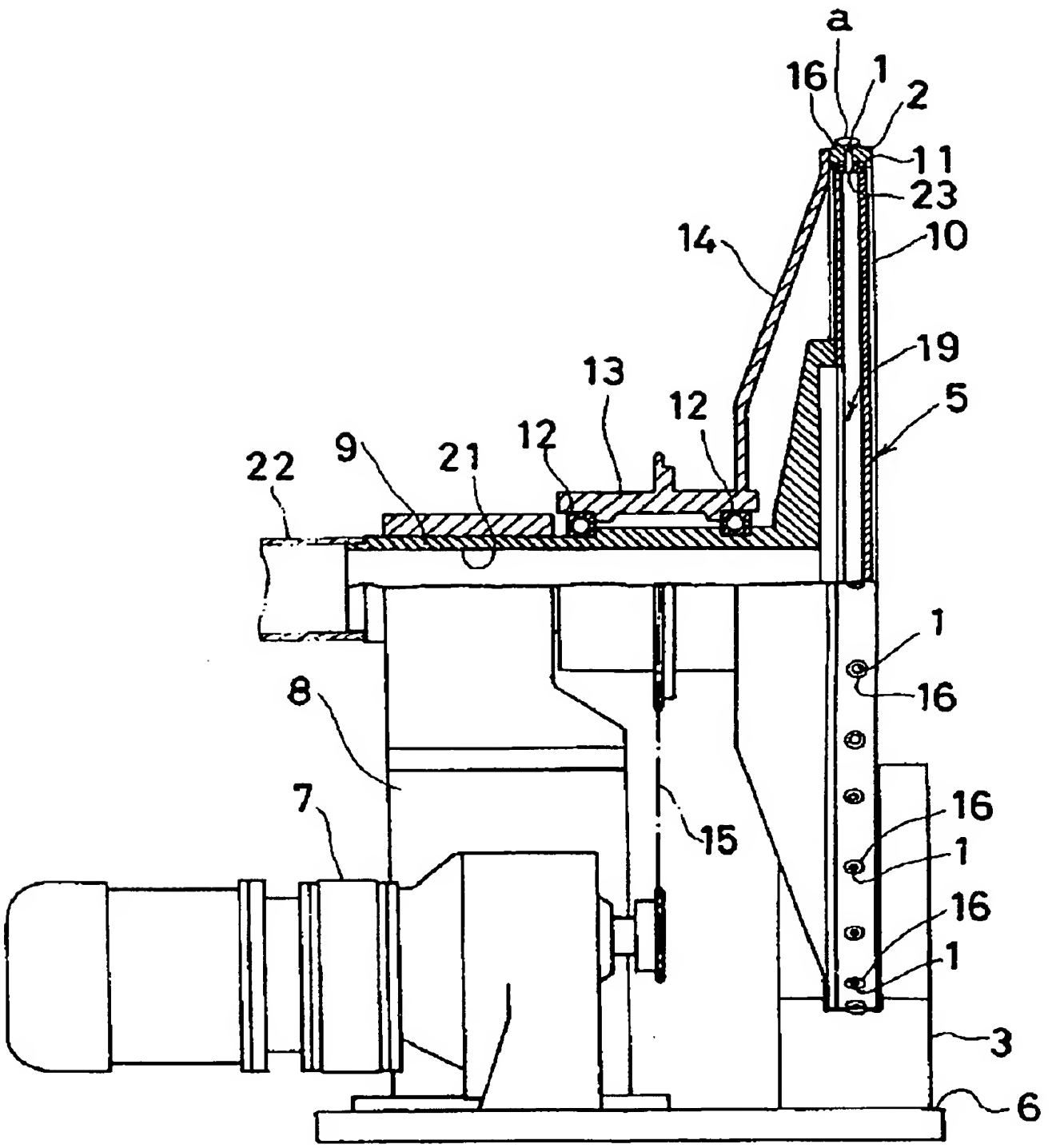

Fig. 3

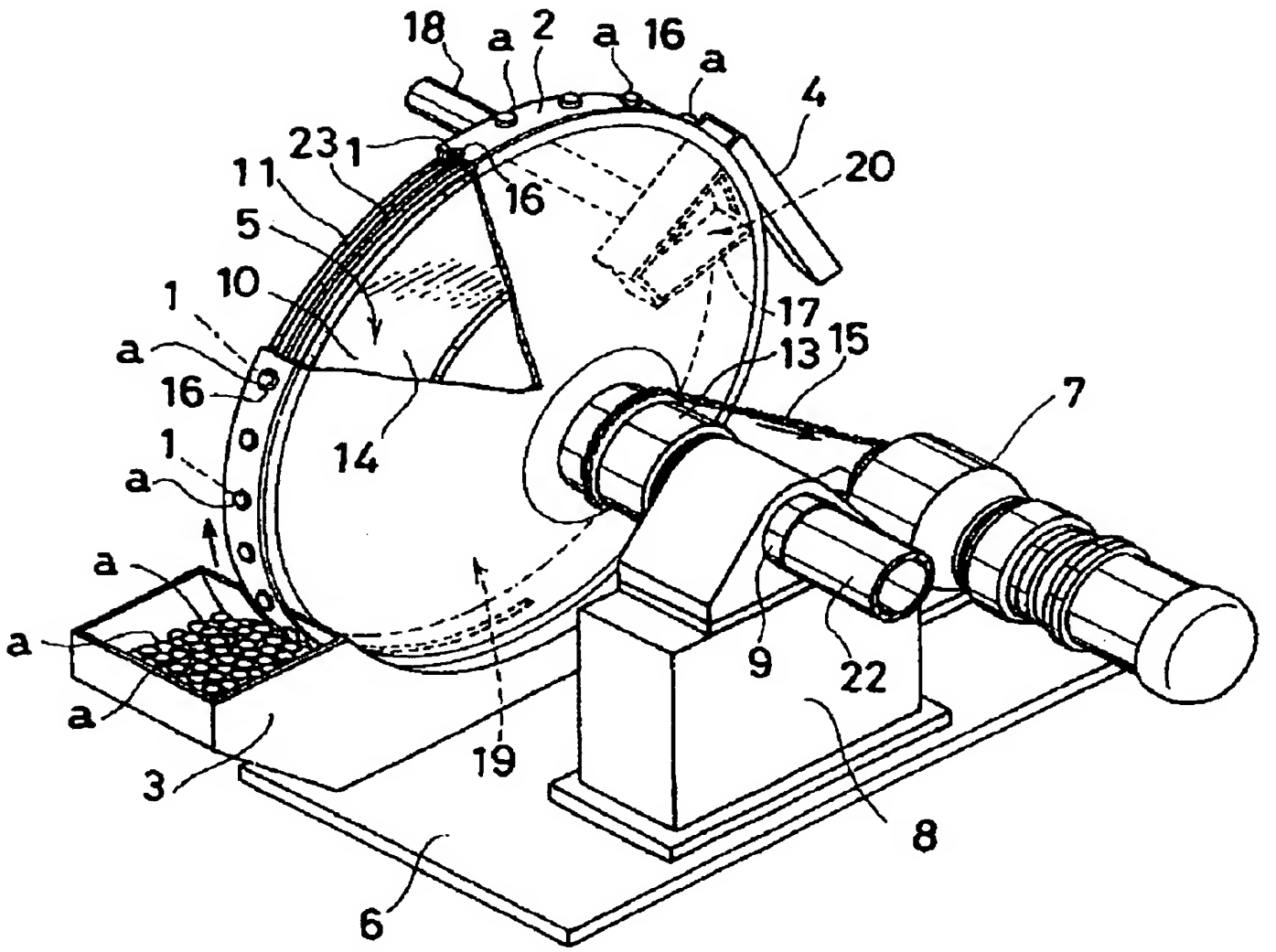

Fig. 4

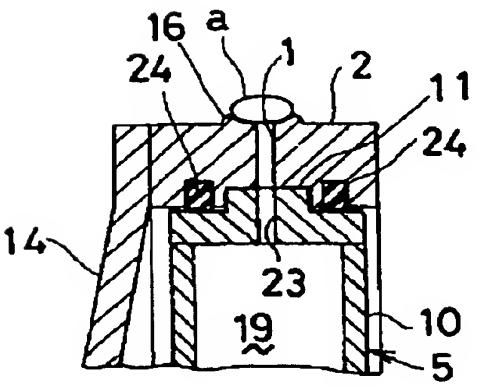

Fig. 5